Mawson & Jacob. *Vaccination and Neurodevelopmental Disorders: A Study of Nine-Year-Old Children Enrolled in Medicaid.* January 2025 Science, Public Health Policy, and the Law Volume: v6.2019-2025

Clinical Question: Is there an association between childhood vaccination and neurodevelopmental disorders (NDDs), particularly autism spectrum disorder (ASD), in nine-year-old children enrolled in the Medicaid program?

PECOT:

- **Population Included**: 47,155 children enrolled in the Florida Medicaid program from birth to age 9.
    - **Exclusion Criteria:** The study did not explicitly exclude children with congenital anomalies due to technical difficulties, but stated that this was unlikely to influence the results, given the large sample size.
- **Intervention or Exposure**: Vaccination, measured by the number of healthcare visits that included vaccination-related procedures and diagnoses.
- **Comparison Group:** Unvaccinated children
- **Outcomes:**
    - **Primary Outcome:** The study aimed to determine the association between vaccination and neurodevelopmental disorders or NDD (autism spectrum disorder, hyperkinetic syndrome, epilepsy, seizures, learning disorders, encephalopathy, and tic disorders).
    - **Secondary Outcomes**: Secondary analyses examined whether preterm birth combined with vaccination increased the odds of NDDs compared to preterm birth without vaccination and whether increasing numbers of vaccination visits were associated with increased ASD risk.
- **Type of Study**: Two different observational study designs.
    - Cross-sectional analysis for Aims 1 and 2.
    - Retrospective cohort design for Aim 3, focusing on the relative risk of ASD associated with varying levels of vaccination exposure.

Quality Checklist for Observational Studies (Yes, No or Unsure):

1. **Did the study address a clearly focused issue? No.** The study lacks a clear hypothesis grounded in established pathophysiological mechanisms.
2. **Did the authors use an appropriate method to answer their question? Unsure**. The study uses observational designs but does not sufficiently address biases such as confounding.
3. **Was the cohort recruited in an acceptable way? No**. The study relied on Medicaid claims data, which may have misclassification errors.
4. **Was the exposure accurately measured to minimize bias? No.** The exposure (vaccination) was measured based on healthcare visits, which do not accurately reflect the actual vaccination status.

5. **Was the outcome accurately measured to minimize bias? No**. Diagnoses were based on Medicaid claims data, which may not reflect true clinical diagnoses.
6. **Have the authors identified all-important confounding factors? No**. The study does not account for family history, socioeconomic status, or environmental factors.
7. **Was the follow-up of subjects complete enough? Yes**. The study included children enrolled in Medicaid from birth to age 9.
8. **How precise are the results? Unsure**. Confidence intervals are provided, but potential biases may distort effect estimates.
9. **Do you believe the results? No**. Given the high risk of bias and failure to account for confounding factors, the results should be interpreted with caution.
10. **Can the results be applied to the local population? No**. The study is limited to Medicaid-enrolled children in Florida, reducing generalizability.
11. **Do the results of this study fit with other available evidence? No**. The findings contradict a substantial body of research showing no causal link between vaccination and NDDs.
12. **Who funded the study? Unsure.** The study does not provide details on funding sources.
13. **Did the authors declare any conflicts of interest? Unsure.** There is no explicit statement of conflicts of interest.

Results: Of the study population, 53% of the study population were male. The major racial group was African Americans (39%), who also had the highest percentage of unvaccinated children (15.8%). Just over ten percent (10.6%) of the children were born preterm.

- **Key Result:**
  - The odds of being diagnosed with any NDD were 3.12 times higher in vaccinated children compared to unvaccinated children (OR 3.12, 95% CI: 2.85–3.41).
  - Preterm birth combined with vaccination was associated with a 3.58-fold increased odds of NDDs compared to unvaccinated preterm children.
  - The relative risk of ASD increased with the number of vaccination visits (e.g., children with 11+ vaccination visits were 4.4 times more likely to be diagnosed with ASD than those with no vaccination visits).

Limitations That Threaten the Validity of the Study:

1. **Selection Bias**: The study relied on Medicaid records, which may not be representative of the general population. Children from higher socioeconomic backgrounds who receive vaccinations outside Medicaid may have been misclassified as unvaccinated.

2. **Confounding Variables**: The study does not control for factors such as parental education, socioeconomic status, maternal health, or genetic predisposition to NDDs. These confounders could explain the observed differences.

3. **Measurement Bias**: The study defines vaccination exposure based on healthcare visits that included vaccination billing codes rather than actual immunization records. This could lead to misclassification of exposure.

4. **Recall and Data Accuracy Issues**: The study relies on claims data rather than clinical assessments. Coding errors or missing data in Medicaid claims could introduce bias into the study findings.

5. **Reverse Causation**: Children who already exhibit early signs of NDDs may visit healthcare providers more frequently, increasing their recorded vaccination visits. This could create a false association between vaccination and NDDs.

Bottom Line: This study has significant methodological limitations that undermine its conclusions. The lack of control for confounding variables, reliance on Medicaid billing data rather than medical records, and potential biases in selection and measurement suggest a high risk of misleading results. Given the overwhelming body of evidence refuting a link between vaccines and NDDs, these findings should be interpreted with caution and skepticism.